

Applicants: Cho et al.
Serial No. 10/040,120
Page 2 of 9

CLAIMS

Please cancel claims 11-20 without prejudice or disclaimer as to the subject matter thereof.

1. (currently amended) An automatic rate-response-sensor-mode switch implemented in a medical device comprising:

a plurality of integrated sensors operatively coupled to a medical device, wherein each of said plurality of integrated sensors provides a signal to the medical device usable to influence a cardiac pacing rate of the medical device and wherein said medical device comprises a dual integrated-sensor operating mode and can mode switch between operating: in a dual sensor mode, in a single sensor mode, in a non-rate-responsive sensor mode based on the signal from all, one, or none of the plurality of integrated sensors;

means for testing a status of said plurality of integrated sensors by comparing for a given period of time the output signals from each said sensor to other of the plurality of integrated sensors to determine if the sensors are providing physiologically consistent signals; and

for each one of said plurality of integrated sensors that does not provide physiologically consistent signals, said testing, means for isolating the one each one of said plurality of integrated sensors and for switching the coupling of the sensors to the medical device so that each said one of the plurality of integrated sensors is decoupled from said medical device such that the medical device operates in one of a single sensor mode and a non-rate-responsive sensor mode.

2. (currently amended) The mode switch of claim 1 wherein said switching remains fixed to operate with said remainder sensors until a reset of the coupling is executed either automatically or via manual selection of a telemetry command to reset is received by the medical device.

BEST AVAILABLE COPY

Applicants: Cho et al.
Serial No. 10/040,120
Page 3 of 9

3. (Previously presented) The mode switch of claim 1 wherein said means for isolating operates on a temporary basis and further comprises means for re-coupling said sensor to said medical device.
4. (currently amended) A mode switch according to claim 1, wherein said means for testing status comprises:
- a comparison of an output signal from each of at least a pair of said plurality of integrated sensors;
 - an impedance check of at least one of said plurality of integrated sensors;
 - ~~a predetermined series of movements performed by a patient who is coupled to said plurality of integrated sensors; or~~
 - structure for comparing a comparison of the output signals acquired during a period of known activity of the patient.
5. (Previously presented) A mode switch according to claim 4, wherein said means for testing is invoked either manually or automatically by an electronic circuitry of said medical device.
6. (currently amended) A mode switch according to claim 1, wherein said medical device comprises an implantable medical device.
7. (currently amended) A mode switch according to claim 6, wherein said implantable medical device comprises an implantable pulse generator.
8. (Previously presented) A mode switch according to claim 7, wherein at least one of said plurality of integrated sensors comprises: an accelerometer, a pressure sensor, an impedance sensor, an acoustic sensor, an activity sensor, a piezoelectric sensor or a heart rate sensor.

Applicants: Cho et al.
Serial No. 10/040,120
Page 4 of 9

9. (currently amended) A mode switch according to claim 1, wherein said means for isolating and for switching comprises a means for interrupting an electrical coupling between the sensor and the medical device.

10. (Previously presented) A mode switch according to claim 9, wherein the means for interrupting the electrical coupling comprises providing an out-of-range null-value signal from said sensor.

11.-20 (canceled)

21. (new) An automatic mode switch according to claim 6, further comprising an external, manually activated telemetry unit, wherein said telemetry unit provides a signal to the medical device and said signal operates to enable or disable the means for isolating.

22. (new) An automatic mode switch according to claim 21, wherein the signal initiates at least one of a non-physiologic "racing heart" response and a physiologic minute ventilation (MV) response.

23. (new) An automatic mode switch according to claim 22, wherein the non-physiologic "racing heart" response comprises one of a non-rate-responsive pacing mode and a physiologic rate-responsive minute ventilation (MV) mode.

24. (new) A computer readable medium for providing electronic signals operable to execute a method of mode switching in an implantable medical device, said medium comprising:

instructions for interrogating a plurality of integrated sensors that are operatively coupled to a medical device, wherein each of said plurality of integrated sensors provides a signal to the medical device usable to influence a cardiac pacing rate of the medical device and wherein said medical device comprises a dual integrated-sensor

Applicants: Cho et al.
Serial No. 10/040,120
Page 5 of 9

operating mode and can mode switch between operating: in a dual sensor mode, in a single sensor mode, in a non-rate-responsive sensor mode based on the signal from all, one, or none of the plurality of integrated sensors;

instructions for testing a said plurality of integrated sensors by comparing for a given period of time the output signals from each said sensor to other of the plurality of integrated sensors to determine if the sensors are providing physiologically consistent signals; and

for each one of said plurality of integrated sensors that does not provide physiologically consistent signals, instructions for isolating each one of said plurality of integrated sensors and for switching the coupling of the sensors to the medical device so that each one of the plurality of integrated sensors is decoupled from said medical device such that the medical device operates in one of a single sensor mode and a non-rate-responsive sensor mode.

25. (new) A medium according to claim 24 wherein said medical device comprises an implantable medical device.

26. (new) A medium according to claim 25, wherein said implantable medical device comprises an implantable pulse generator.

27. (new) A medium according to claim 26, wherein at least one of said plurality of integrated sensors comprises: an accelerometer, a pressure sensor, an impedance sensor, an acoustic sensor, an activity sensor, a piezoelectric sensor, a heart rate sensor.

28. (new) A method of mode switching a medical device, comprising:
operatively coupling a plurality of integrated sensors to a medical device, wherein each of said plurality of integrated sensors provides a signal to the medical device to influence a cardiac pacing rate of the medical device and wherein said medical device comprises a dual integrated-sensor operating mode and can mode switch between

Applicants: Cho et al.
Serial No. 10/040,120
Page 6 of 9

operating: in a dual sensor mode, in a single sensor mode, in a non-rate-responsive sensor mode based on the signal from all, one, or none of the plurality of integrated sensors;

testing a said plurality of integrated sensors by comparing for a given period of time the output signals from each said sensor to other of the plurality of integrated sensors to determine if the sensors are providing physiologically consistent signals; and

for each one of said plurality of integrated sensors that does not provide physiologically consistent signals, isolating each one of said plurality of integrated sensors and for switching the coupling of the sensors to the medical device so that each one of the plurality of integrated sensors that does not provide physiologically consistent signals is decoupled from said medical device such that the medical device operates in one of a single sensor mode and a non-rate-responsive sensor mode.

29. (new) A method according to claim 28, wherein said switching remains fixed to operate with said remainder sensors until a reset of the coupling is executed either automatically or via manual selection of a telemetry command to reset is received by the medical device.

30. (new) A method according to claim 28, wherein said isolating step occurs for a temporary period of time and further comprising re-coupling said sensor to said medical device following said temporary period of time.

31. (new) A method according to claim 28, wherein said testing steps comprises:
comparing an output signal from each of at least a pair of said plurality of integrated sensors;
checking an impedance value of at least one of said plurality of integrated sensors; and
comparing the output signals acquired during a period of known activity of a patient.

Applicants: Cho et al.
Serial No. 10/040,120
Page 7 of 9

32. (Previously presented) A method according to claim 31, wherein said testing step is invoked either manually or automatically via electronic circuitry of said medical device.
33. (new) A method according to claim 28, wherein said medical device comprises an implantable medical device.
34. (new) A method according to claim 33, wherein said implantable medical device comprises an implantable pulse generator.
35. (new) A method according to claim 34, wherein at least one of said plurality of integrated sensors comprises: an accelerometer, a pressure sensor, an impedance sensor, an acoustic sensor, an activity sensor, a piezoelectric sensor, a heart rate sensor.

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ **BLACK BORDERS**
- ☐ **IMAGE CUT OFF AT TOP, BOTTOM OR SIDES**
- ☐ **FADED TEXT OR DRAWING**
- ☐ **BLURRED OR ILLEGIBLE TEXT OR DRAWING**
- ☐ **SKEWED/SLANTED IMAGES**
- ☐ **COLOR OR BLACK AND WHITE PHOTOGRAPHS**
- ☐ **GRAY SCALE DOCUMENTS**
- ☒ **LINES OR MARKS ON ORIGINAL DOCUMENT**
- ☐ **REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY**
- ☐ **OTHER: _____**

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.